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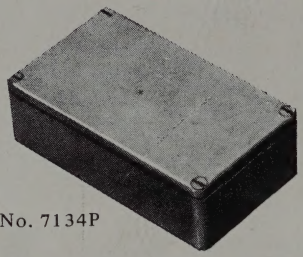

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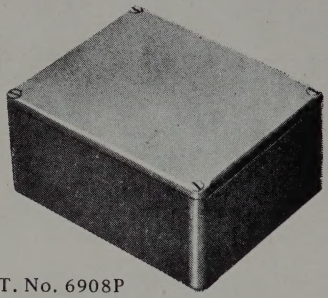

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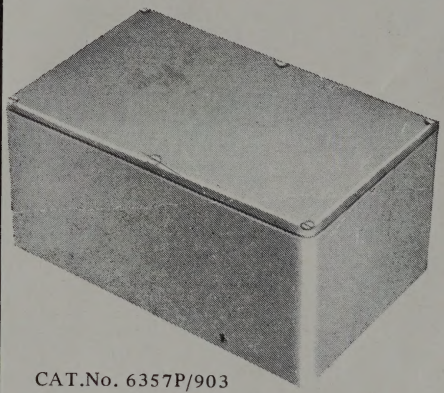

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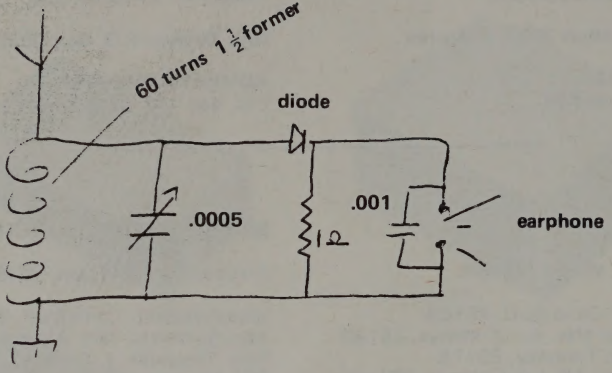

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This edition of Radio ZS comes to you throughtthe efforts of the Cape Town Branch members who have contributed the articles. Our thanks to all who contributed.

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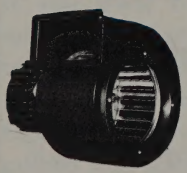

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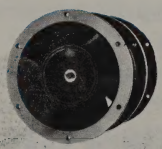

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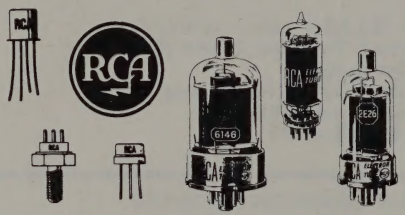

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QUITE UNORIGINAL

By Ted Baker, ZS1RA

The Time: 0845 SAST
The Day: Some Sunday.
The Occasion: Cape Town Branch Bulletin.
The Action: No Bulletin – TX Gone Sour

The reaction: The following article – Blantantly pinched from October '64 issue of "CQ", narrated to Bulletin listeners in place of the missing news and views. So well received that we felt that "RADIO ZS" readers would enjoy it too.

A PARENTHETICAL FAIRY TALE

C. F. Turner – W1JBQ.

Once upon a time there was a little boy who lived in a far off country. His father was very rich (good thing – you'll see why later).

One day the little boy was playing in the woods near the castle, (he lived there) when he saw a very odd little creature with eyes that glowed like filaments (4-1000A's). The little boy approached the beetle (that's what he looked like) very cautiously, for he didn't know whether he was dangerous or not (he'd left his I.F.F. toy at home). The boy noticed that the bug was blinking his eyes in a very odd manner. The bug (or beetle if you insist there is a difference) was using two of his many appendages to open and close his eyelids. Furthermore, he was not closing both eyelids together, but first one and then, as he pushed that open, he'd pull the other closed. The boy watched for quite awhile (nothing else to do) before he asked the beetle:

"Tell me, strange sir, what is that you're doing? "
(It's a fairy tale, remember).

"Well, young man," the beetle replied, "My optical amplifier grids (eyelids to you) are not self-excited like yours, so I must drive them from another source."

"Oh, I see," exclaimed the boy (he didn't really – but you know how it is), "but why first one eyelid and then the other? "

"Ain't you never heard of push-pull, sonny? " the beetle snapped.

"No, I haven't," admitted the kid, "What would you call the way I work my eyelids – both at the same time? "

"Well if the way I'm doing it is push-pull, then I'd say your way is push-push. With two eyelids, I guess you could say you were doubling," answered the beetle.

"Har-de-har-har," sneered the boy. (He had picked up the phrase from a wandering over-weight jester). "I think I'll step on you and do my good deed for today".

Now the beetle, using the built in instinct with which Mother Nature provides all her creatures, began to feel that maybe, this was a mean

widdle kid, who might, just might, do him harm, so he sought to protect himself. An arc snapped between his antennae (4000gc.). It seemed that the increased adrenalin, or whatever beetles have, caused an overload. With that he flew at the mean widdle kid with eyeballs (the beetle's) glowing red (the arc had caused a high standing wave ratio).

The boy reacted, turning to run for home. Alas, the beetle bit him (where? — use your imagination!), and flew off blinking his blinking eyes (push-pull of course) Class B (B for beetle).

The little boy ran for home screaming (400 cycles — 200% Modulation), but when he arrived and tried to explain what had happened, he could no longer talk. Every time he opened his mouth, all that came out was:

"Dar-dit-dar-dit-/Dar-dar-dit-dar".

Although his crying soon subsided, his dar-ditting continued. His parents, not being the type to call the doctor every time their son hiccupped, began to wonder (after a week) if perhaps there was something wrong with the kid.

The best medical minds of the realm were summoned, but to no avail, until one day an obscure physician (he wore a mask) arrived at the palace. He spoke not a word, however, and because he wrote all questions and answers, was obviously deaf and dumb. When asked what his name was, he wrote:

"Maximus, or Maxim for short".

When ushered into the boy's room, Maximus (or Maxim for short) wrote "Speak to me" on a card. (No, it wasn't a QSL card).

The boy opened his mouth to try, but all that came out was:

"Dar/dit/dit/dit-dit/dar".

The physician's eyes lit up and he spoke (if you can call it that) for the first time, saying, "Dar-dar-dit-dar/ Dit-dar-dit/Dar-dar-dit-dit" (with a questioning tone, of course).

"Dit-dit-dar-dar-dit-dit" is all the boy could answer (he hadn't learned his Q signals yet).

Turning to the anxious parents, the obscure physician (he still wore his mask) scribbled on a card;

"I have an advanced stage of the same malady. Your son was bitten by a Scorpius Rundfunkus (a radio bug to you). There is no cure. Temporary respite can be effected by attaching complex electronic gear to both his hands for certain periods of time. After these treatments he will speak for brief periods, but the malady always returns, and the treatment must be repeated again and again. By the way, what is your son's name?

"Hamlet", answered the father, "or Ham for short".

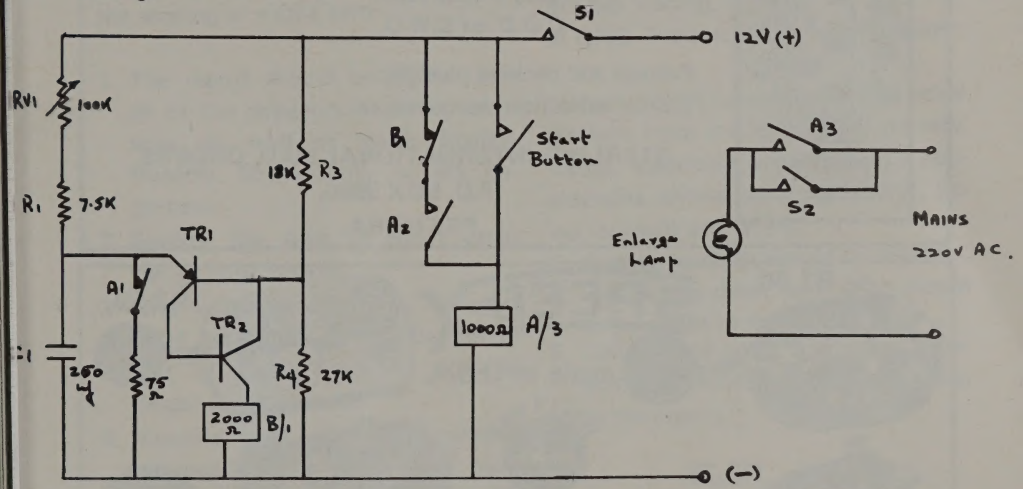
And that kiddies, is how the first
Ham was bitten by the radio bug.

ELECTRONIC TIME METER FOR THE DARKROOM

by Colin Duff ZS1CA

Having used a mechanical clockwork timer for enlarging purposes for some time, certain disadvantages arose which made it unreliable and temperamental in operation. On long periods of timing, over 30 seconds, it would sometimes stop for no reason at all, and in short periods, reset accuracy was a hit and miss affair. In order to overcome these disadvantages it was decided to look into the possibility of making an electronic timer, which in order to start, one merely pressed a start button after setting the timer for the timing period required. Repetition would therefore be no problem as the timing interval is set by means of a potentiometer and does not have to be touched.

Referring to the circuit, components RV1, R1 and C1 control the



timing intervals. Relay Contact A1 and Resistor R2 should be disregarded for the time being for the operation of the timing circuit. When a positive voltage is supplied via RV1 and R1, the capacitor C1 will charge, and the time taken to reach a certain value will depend on the capacity of C1 and total resistance of RV1 and R1. Transistors TR1 and TR2 are PNP and NPN silicon types respectively, connected in a configuration which is similar to the physical makeup of a Thyristor or Silicon Controlled Rectifier. In fact they behave in a similar manner. It will be noticed that the base of TR1 and collector of TR2 are biased to certain voltage dependent on the values of R3 and R4. Now in the timing process, the voltage at the emitter of TR1 will rise and once it has reached a voltage slightly higher than its base, controlled by R3 and R4, TR1 will switch in to forward bias the emitter-base junction of TR2. It will in turn switch hard on, operating relay B, completing the timing interval.

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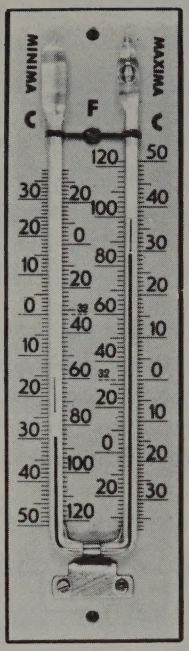

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ABOUT MAKING SWL REPORTS

By Robert Jung ZS1RR

A common complaint from our listener members is that they do not receive QSL cards from amateurs to whom they send a listeners report. Now let us see if we can not do something to improve this. It is not always the unwillingness of the amateur to send back a QSL card. At least 90% of the stations will send a card if the report is of any real use and warrants the sending of a QSL card.

1. The report should be legible. Not all of the amateurs in other countries do read or speak English fluently. So legibility is very important.
2. Specify the time in GMT, using the 24 hour system.
3. Give a proper indication of your QTH, i.e. Kuilsriver, 20 miles northeast of Cape Town. If possible height above sea level.
4. Receiver used. Give type number or specify how receiver is built up. Do not put only "Superhet". That can be a selfmade 3 or 4 valve job, or a R1,000 worth communication receiver.
5. Give full details about the antenna used. Type of antenna, length in the case of a random or longwire. Most important the direction the antenna is pointing, looking straight down the antenna. The height of the antenna.
6. Details about signal strength and readability. These are most of the times the only things given. By themselves they are not of much use, but with all the other information they are vital. Either the international SINPO code or in the amateur world more familiar,

a/ RST. Readability. Signal strength and (for CW) Tone.
b/ QRM. With indication of the source of QRM, if possible.
c/ QRN. Atmospherics.
d/ QSB. Fading.
e/ QRG. Frequency, as far as possible.

Reports about signal strength of other stations from the same area, are very useful, especially when there is a considerable difference in readability, signal strength and fading.

8. S-meter readings should be accurate, and details about calibration should be included in the report.
9. Callsign and signal strength of other station, should also be included in the report.

An example report could look like:
R. O. Brodie ZS1-2345. 15 Rose Street Kuilsriver. Cape. R.S.A. 20 miles NE of Cape Town . . . . ft a.s.l.

DATE/TIME/FREQUENCY
Saturday 25th April 1970. 1720 GMT. 14.200 Khz.

SIGNAL REPORT
W1ABC ur SSB signal RST 59. In QSO ZE1XYZ his RST 56.

EQUIPMENT
Codar CR70A receiver. Headphone reception.

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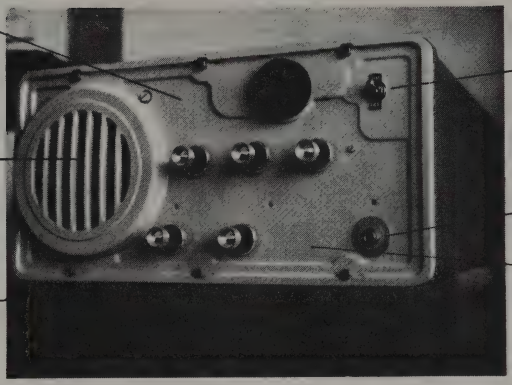
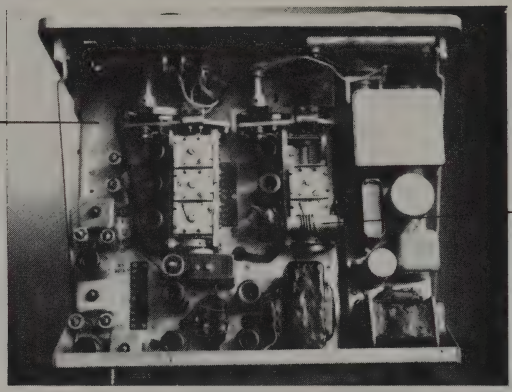
6M. CONVERSION OF B.44. TRANSMITTER/RECEIVER

by Ray Alexander ZS1IM


Remove speaker on/off switch.
Remove the plastic protection cover from the front of the speaker for better reception.
Old knobs from front panel make excellent legs — bolted together with rubber bases.
S.P.D.T. Switch (replacing the rubber push-button on left side of meter — in the "off" position it reads the battery voltage, and "on" reads TX relative output power via the diode in ant circuit).
MIKE INPUT (and TX/RX switch using a 3 way jack)
When removing tel socket, tape up the wires carefully (keeping paired wires soldered together where found so, and isolating other wires from each other carefully.)


Remove the High and Low Pass filter redirectin the ant lead to back panel. Retain the Diode and resistor and wire them into the ant out-put circuit, to the switch on front panel.
P.A.: Increase to 5 turns. Line up with G.D.O. (Osc 25 mcs, Doubler and P.A. 50 mcs.).
TX Crystal (8.334 to 8.400 Mcs.)

3-way JACK SOCKET
10-25 pf variable condenser across new oscillator coil.
Receiver Oscillator Coil: 15 turns 22SWG wire close-wound on ¼" former (slug-tuned). Puts oscillator on 16.6 mcs approximately instead of 8.3 mcs. Wire into the crystal socket. Align RX section with 50 mcs signal from signal generator.
Pad these two coils by putting 63 pf ceramic condensers across them.
Pad these three coils by putting 50 pf ceramic condensers across them.
Cut hole in appropriate position on outer cabinet to allow access to these terminals.
FUSE
12 volts D.C. (from battery)
ANT. SOCKET

6M. CONVERSION OF B.44. TRANSMITTER/RECEIVER

by Ray Alexander ZS1IM

The B44, MK3 VHF Transmitter-receiver was originally designed for radio telephone communication within a light A.A. regiment. The set is portable and operates from a 12 volt battery, drawing about 3 amps on receive and 6 amps on transmit. It has 3 preset crystal controlled channels in the 60-95 mcs band, but is easily converted to operate on 50 mcs.

In the conversion described the receiver becomes tunable over the 6 meter band, and the transmitter remains crystal controlled. Although listed in Hamrad's catalogue at over R40, they are selling them in Cape Town to callers only, at R10 complete with crystals etc., and they still have over 100 in stock.

The receiver employs eight tubes and is very selective. The IF's are on 54 khz and the line-up includes a signal rectifier, AGC rectifier, noise limiter, and push-pull audio output. Although the output of the oscillator was originally designed to operate on the sixth multiple of the crystal frequency, better results were obtained by operating it as a tripler. The tunable coil is therefore wound to resonate at approximately 16.6 mhz instead of 8.3 mhz.

The transmitter conversion is quite simple, but a GDO will be a great help in aligning the 3 stages. A word of advice here — don't remove the tank coil, simply cut in a convenient place and solder in the extra two turns using a similar thickness wire.

On the Cape Town 6 meter evening nets, you can hear ZS1SP, ZS1VN, ZS1FM, ZS1IM, ZS1RR and ZS1VT regularly using their B44's with surprisingly good results. Get cracking chaps, here's the quick and easy way to get on SIX, mobile or fixed.

SWL reports *de Page* 9

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40 ft. longwire pointing N-S, 20 feet up.

QRM/QRN/QSB/
QRN: nil QRM: 1-2 (slight/moderate) from local ZS4 station abt 5 khz higher QSB: 1 (slight) 58/59.

S-METER CALIBRATION
1 uV input reads S9.

REMARKS
Also hrd Q1DEF RST 55 no QSB. Rcvd more Q1/W2 stns during 1630 and 1715 GMT, average RST 57 QSB nil/1
Please QSL. Stamps / IRC's enclosed.

The above is not rigid, and is mainly ment to be a guide for those SWL's who do not seem to get replies, or for those just starting to listen on the amateur bands and short waves. However, such a report stands a very much greater chance of a QSL card than the all to common, "Heard you on my super, signal 57, in 40 meter band, Sunday morning, please QSL".

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J. M. van Niekerk, ZS6NG

ZS1AZ

RCA TEST EQUIPMENT

THE WR 50–B RF SIGNAL GENERATOR.

SPECIAL PRICE TO HAMS R49.00

- 85 KHz – 40 MHz.
- Crystal calibrating oscillator circuit with front panel crystal socket.
- Internal 400 Hz audio oscillator.
- 455 KHz and 10.7 MHz sweep for output receiver alignment.

AVAILABLE FROM: RADIOKOM (1969) (PTY.) LTD.,
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TRANSVAAL.

IMPROVEMENTS TO THE FL 100 B SIDEBAND TRANSMITTER.

by Fred van Niekerk ZS1CK

From the time I first acquired the FL 100 B Sidebander transmitter I experienced difficulties the first of which was frequency drift. I tried everything to stabilise the frequency without making drastic changes. The best I found was to build a separate V.F.O. which could be placed on top of the transmitter and with a short piece of Coax fed the output to a plug for this purpose on the rear apron of the rig. The oscillator forms a separate article also submitted for publication. The rig is now very stable frequency wise. The next problem encountered was the 6BA6 in the IF strip. This tube appeared to have lost its emission and was replaced with an EF93 with improved results. No alterations to the base connections. The third problem was the one small diode on the Balanced Modulator having lost its reverse resistance, from 100K to 50K. This was causing loss of talk power and plenty of carrier on sidebands.

Both tiny diodes were removed and replaced with a pair of matched OA10 diodes with a reverse resistance of 2MEGohms on each. This resulted in much more talk power and for all practical purposes no carrier at all on a receiver in the same room tuned to the operating frequency. The balanced modulator was re-balanced with the two small pots and the transmitter is at present a totally different job with increased signal power, and better modulation; in fact the improvements were so great that fellow hams who had become used to my signal before improvements wanted to know whether I had acquired a more powerful rig. They just could not believe that the improvements could make such a vast difference to the rig. The OA10/5 with a higher reverse resistance resulted in practically no carrier on sidebands and increased signal strength. The final tube 6DQ5 was suspect when a loss of power was first noted. A new tube proved that loss of power was not due ot the output tube so the one used up to that time was put back in the rig and is working perfectly. The 6BA6 tube is the only one of its kind in the rig, but I found the EF93 a much better tube in this position with increased efficiency which was immediately noticeable. I am very happy with the rig's present performance. The standing current on speech is 40MA and speech peaks up to 150MA with the audio gain between $\frac{1}{3}$ to half open. Reports also include "no carrier".

A STABLE V.F.O.

by Fred van Niekerk ZS1CK

Having had drifting problems from an FL 100B Sidebander (Japanese), I decided to build an outboard V.F.O. The FL 100B has provision on the back apron of the chasis for an outboard oscillator to be plugged-in. Remembering the very stable oscillator on the Command Transmitter I wound

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the coil with an extra winding to take the one leg of the filament. Since the filament in the original Command Transmitter was fed with D.C. filament voltage I wondered whether A.C. filament voltage would introduce the AC Hum, but no A.C. hum could be detected in the final product. I have been using this outboard oscillator on my rig and have not had any sign of frequency drift. The tube is a 6C4. The secret of the stability of this oscillator is in running both filament leads through windings on the grid coil, as shown here.

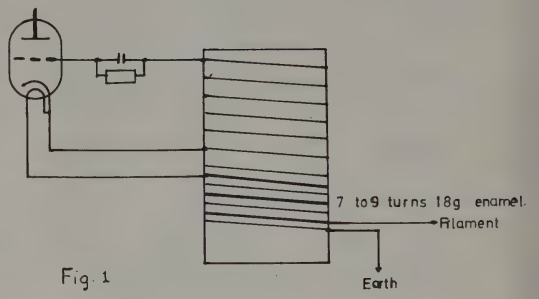


Fig. 1

The oscillator's rage is 4.9mc to 5.5 mc for all bands on the FL 100B.

Coil dope
Coil former, Porcelain, 1½ inches diameter
Grid coil 12 turns 16 guage tinned copper
filament coil 6 turns 20 guage wound in centre of grid coil between grid windings.
Cathode tap 6 turns from cold end.

C1 – 100PF Variable tuning with slow motion dial.
C2 – 30 PF Neg. Coefficient fixed.
C3 – 60 To 100 PF Compression type padder.
C4 – 100 PF.
C5 – 50 PF.
R1 – 40 K ½watt resistor.
L2 – RFC 2.5MH
L1 – 12 turns 16 guage tinned copper space 1½ inches cathode tap 6 turns from cold end.

L3 – Filament winding 6 turns 20 guage enamel wound between turns of the grid coil L1.

TUNING RANGE. 4.9 to 5.5 MC covers all bands on FL 100B transmitter. The Layout and design is left to the individual and the placing of components is not critical. I used a small chassis 6" x 6" x 1½ with a small panel in a small metal box. The chassis and box came from the junk box.

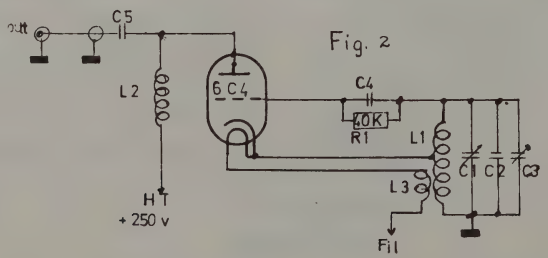
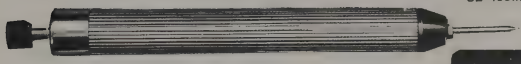


Fig. 2

RF FIELD STRENGTH METER 1-400 Mhz. Comes with 5 section antenna and earphone for modulation checking. Invaluable for tuning and transmitter. Magnetic base for mobile use
FL 30 ha. only R8.00



SIGNAL INJECTOR. The gadget for trouble shooting and repairing your transister radio, amplifier, Ham receiver, Tape Recorder, etc. Includes the battery.
Model SE 250 B. only R5.20

Also obtainable a 11 Meg Ohm input. VTVM. mains 220 volt. Measures AC and DC up to 1500 volt. Resistors up to 100 Meg ohms. Large meter. Wired and the probe is supplied.
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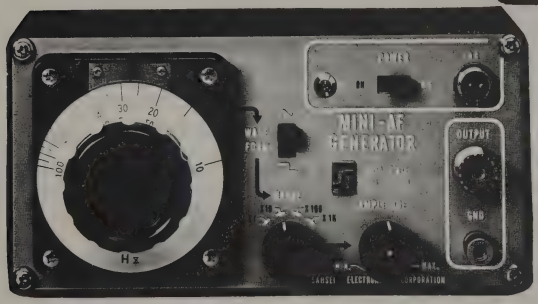

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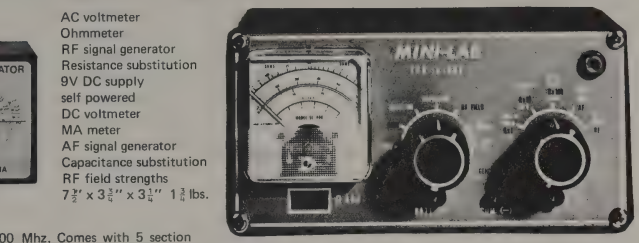
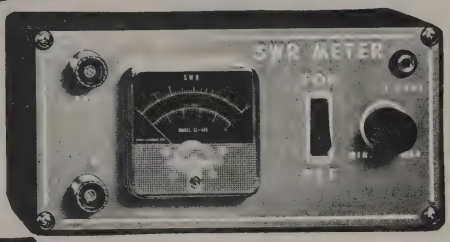
Mini AF generator for the laboratory or ham work bench. 10 to 100 Khz in four bands, sine or square wave. Worlds smallest $7\frac{1}{2}$"x$3\frac{3}{4}$x4" 2 lbs. Built in AC power supply stabilized to O.1% The output is is maintained at minimum distortion and constant level with FET oscillator and thermister and heavy inverse feedback.
Model 6803. AF Generator only R45.00



Thanks to transistors and printed circuits you can hold this complete lab in one hand. Not long ago this would have been a whole shelf full of test equipment. 455 Khz generator for aligning if's.400 Hz generator for audio circuits. Plus a normal VOM and R + C substitution. Field strengths meter for tuning transmitters. Everything in one small box!
SE 400.Mini Lab. only R18.00



52 Ohm 1 KW SWR meter. Simple. Inexpensive. Effective. Model SE 405. only R13.70

52 Ohm MINI SWR meter. Standard connector. Ideal for mobile.
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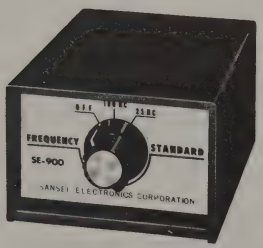

FREQUENCY STANDARD. 100 and 25 Khz.9 volt battery inside cabinet. Includes putput cable. Multi vibrator x-tal controlled.
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FOR SALE: Heathkit Apache TX1 Transmitter and Hallicrafters SX 110 Receiver with Speaker. Both in mint condition with handbooks. R300 cash for both. Write Holland, Box 9, Quthing.

FOR SALE: "Two 20W Pye "Mercury" H.F. radio telephones. Completely transistorized receivers tunable from 535 Kc/s to 10 Mc/s. Transmitters 10 preset crystals can be easily adapted for V.F.O. operation. Robust construction suitable for vehicle mounting. These are now redundant A.M. radio telephones in perfect working condition and can be viewed at the offices of Messrs. Taylor and Mitchell Timber Supply Company (Pty) Limited, Dienst Street, Alrode Extension 2, Alberton, Transvaal. Photo copies of manufacturer's leaflet can be obtained from Taylor and Mitchell Timber Supply Company (Pty) Limited, P.O. Box 3731, Alrode, Transvaal. Price:- Highest offer ex our premises Alberton."

Ham — ads

FOR SALE: KW2000 Transceiver complete with AC and DC Power Supplies and Mobile Antennae for 40m and 80m — immaculate condition — Price R300 o.n.o. ZS20K, 16 Innes Street, Kingwilliams Town.

AMENDMENTS TO CALLBOOK No. 22

ZS1AV Dennis Wells, C/o Chief Technician, C.P.O. Workshop, Blackwood Road, Hamilton, Bloemfontein.
ZS1BO (ex ZS6BFW) O. W. Griffiths, 22 Camden Street, Brooklyn, C.P.
ZS1LA J. B. Knol, P.O. Box 138, Plumstead, C.P.
ZS1LE R. Fuller, Now a member
ZS1TJ (ex ZS3T) J. D. Laufs, P.O. Box 2562, Cape Town.
ZS1TF J. F. Bastiaans, Post Office, Bredasdorp, C.P.
ZS1WN John Webster, Helderberg College, P.O. Box 22, Somerset West, C.P.
ZS2ID I. D. Viljoen, 51 Primula Drive, Uitenhage, K.P.
ZS2JW J. W. Carter, 35 Wyse Avenue, Abbotsford, East London, C.P.
ZS2KT Louis A. Terblanche, van der Stellaan 70, Uitenhage, K.P.
ZS3KR R. C. Jackson, P.O. Box 92, Bleskop, Dist. Rustenburg, Tvl.
ZS3AV A. N. v. d. Merwe, G.P.O. Otjiwarongo, S.W.A.
ZS3T J. D. Laufs — delete — ZS1TJ
ZS3WP M. P. Oosthuizen, Posbus 114, Oshakati, S.W.A.
ZS4LO M. J. L. Kruger, Posbus 4567, Durban.
ZS4MG Sid Coosner, P.O. Box 199, Kroonstad, O.F.S.
ZS4TV A. R. Howard — delete — see ZS6TV
ZS5D Arthur K. S. Hemsley, 408 Tenburg, Erskine Terrace, South Beach, Durban.
ZS5TE P. E. A. Lindeque, S.A. Fruiters, Illovo Beach, South Coast, Natal.
ZS6AGS F. Swwyer, P. O. Box 1824, Johannesburg.
ZS6AIS S. Lager, V.P.C. Ltd., P.O. Box 6253, Johannesburg.
ZS6BFW O. W. Griffiths — delete — see ZS1BO
ZS6KS Ronald Payne, 9 Woodley Road, Darrenwood, Randburg, Tvl.
ZS6RC L. Keith Fenton, 43a Garden Road, Orchards, Johannesburg.
ZS6TV A. R. Howard, P.O. Box 209, Barberton, E. Tvl.
ZS1CW C. W. Warren, Now a member.
9J2MG/ZS4MG Sid Coosner, P.O. Box 199, Kroonstad, O.F.S.

TIME METER

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The full sequence of operation of the timer is as follows. Positive voltage of 12V is applied via S1, but C1 is unable to charge as it is virtually short circuited by Relay Contacts A1 and Resistor R2. In order to start the timing procedure, the start button is pressed and released. Relay A/3 operates and holds via its own contact A2 via contact B1 to positive 12 volts. A1 contact now opens allowing C1 to charge and at the same time A3 contacts make to light the enlarger lamp. Once the timing interval has been completed, as explained previously, the timer is automatically reset and is ready immediately for a further timing period.

Long term stability of the timer is dependent on the quality of the capacitor, a Tantalum type would be prefered but as the cost of this component is likely to be high, a good quality electrolytic can be used. A total maximum period of almost 40 seconds was obtained with the components as listed and a minimum period of 2 seconds was obtained using a value of 7.5 ohms. In order to switch the enlarger lamp on independently of the timer, a further switch S2 is provided across relay contact A3, so that focusing or adjusting print size can be carried out.

No problems should be experienced with the relays, they are P.O. type 3000 and can be obtained from me or our ZS advertisers. Relay A/3 has a resistance of 1000 ohms and B/1's value was 2000 ohms. B/1 relay contacts should be adjusted with a late break with very light tension; this is important, as in operation, this relay only flicks in when the transistors are driven hard in. To check the operation of this relay, remove one of the legs of Resistor R2 and place a 0—10 milliampmeter in the B/1 relay circuit to observe the current drawn. There should be no more than 10—20 microamps flowing in the circuit once 12V(+) is applied to the timing circuit. When the timing interval is completed, the transistors will switch hard on with a flick current of between 3 to 5 milliamps, settling to about 1 milliamp. The relay should have operated under these conditions, if not, check the tension of spring sets as previously mentioned.

A word about the transistors at this stage would be prudent — use only Silicon types of about 300 milliwatt rating. Almost any types could be used and it is preferable to find matched pairs. Germaniun types will not work due to their low interval leakage resistance, this will be shown up by a high standing current. Under these conditions the capacitor C1 will not charge to its full value.

Power requirements are slight, a maximum of 14 milliamps was noted, making it ideal for Battery working. On the other hand a small mains power pack could be built-in, this is to be prefered as the mains exists for lighting the enlarger lamp.

1970 LEAGUE CONTESTS

This years contests will be held on the following dates:-

AM	August 2nd
SSB	August 23rd
CW	September 13th

and rules are published elsewhere in this issue.

Last year the rule regarding multipliers was modified in order to be fairer to all contestants. Much comment was received, most of it unfavourable, so this year we have reverted to the previous method and contacts with one's own zone will be a multiplier.

Use any paper when sending in your log, no special entry forms are needed, but please show details called for in the rules especially show serials given and received in that order. It is the odd one that shows serials the other way round that causes such a problem in checking. Please use only one side of the paper.

Don't forget to show the name of your branch and it is amazing how many logs do not show the entrants name and address.

Listener members should remember that the object is to log as many different stations as possible — duplicates do not count. Who will be the first listener to win the newly presented Gordon Eastes Listeners Trophy?

We look forward to your log and would welcome your comments on the contests.

CONTEST COMMITTEE

1970 S.A.R.L. WEDSTRYD REELS

Tydperk: Datums: AM 2 Augustus
ESB 23 Augustus
GG 13 Augustus
Tyd: 1400 tot 1900 SAST
(1200 - 1700 GMT)

Bande: 3.5, 7 en 14 Megeherz. Amatuurbande.

Nommer ruiling: Foon stasies sal ruilnommers van 5 syfers gebruik. Gelykgolf stasies sal ruilingsnommers van 6 syfers gebruik; seinde RS of RST gevolg deur 'n 3 syfer volgnommer. Enige nommer mag gebruik word vir die eerste volgnommer, maar daarna moet die volgnommer deur een ver-

1970 S.A.R.L. CONTEST RULES

Period: Dates: AM 2nd August
SSB 23rd August
CW 13th September
Time: 1400 to 1900 SAST
(1200-1700 GMT)

Bands: 3.5, 7 and 14 Mhz. Amateur Bands.

Number Exchange: Phone stations will exchange numbers using 5 digits. CW stations exchange numbers using 6 digits. These being RS or RST followed by a 3 digit serial. Any number may be used for the first serial but thereafter the serial must increase by one for each contact.

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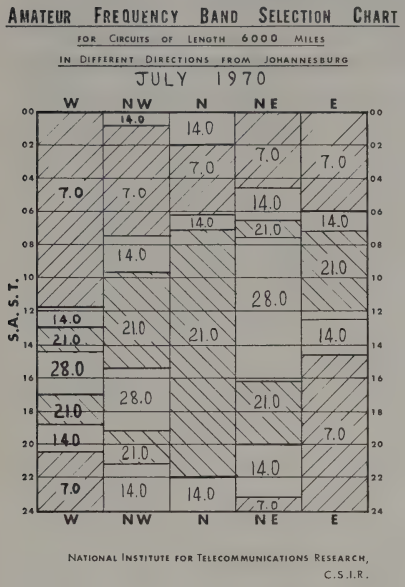
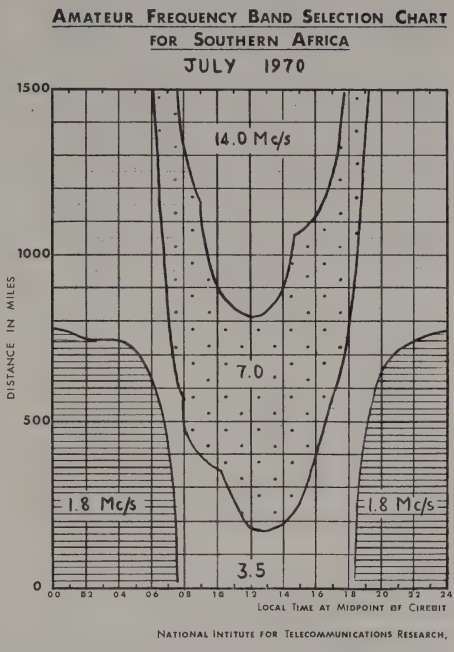
FREQUENCY PREDICTION CHARTS


AMATEUR FREQUENCY BAND SELECTION CHART
FOR CIRCUITS OF LENGTH 6000 MILES
IN DIFFERENT DIRECTIONS FROM JOHANNESBURG
JULY 1970
W NW N NE E
S.A.S.T.
NATIONAL INSTITUTE FOR TELECOMMUNICATIONS RESEARCH, C.S.I.R.



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SB 101, R395.00

model HW 100, R268.00
AC power supply R65.35

YOUR HEATHKIT HAM CENTRE

meerder word vir elke daaropvolgende kontak.

Toekennings: 5 punte vir elke kontak. Punte sal egter afgetrek word vanweë foutiewe logomroepe en volgnommers.

Vermenigvuuldiger: 'n Vermenigvuldiger van een vir elke gebied gewerk. Die gebied is: Gebied 1 — ZS 1
Gebied 2 — ZS 2
Gebied 3 — ZS 3
Gebied 4 — ZS4
Gebied 5 — ZS 5
Gebied 6 — ZS 6
Gebied 7 — CR 7, ZD 5, ZE, 5H3, 7Q7, 9J2
Gebied 8 — A2C, CR 6, ZD 9, ZS2MI, 7P8.

Telling: Die totale aantal punte van elke band moet deur die gebiedsvermenigvuldiger van die band vermenigvuldig word vir die vasstelling van die bandtelling. Die som van elke bandtelling sal die totale telling van al die bande saam voorstel. 'n Tweede kontak met dieselfde stasie op een band sal die punte verwerf nie. Luisteraars moet die beide stasie wat gehoor word en die stasie wat gekontak is sowel as die volgnommers noteer.

Toekennings: Sertifikate sal aan die wenners van elke afdeling toegeken word, GG, AM en ESB. Tweede en derde pleksertifikate sal ook toegeken word, mits 5 en 10 inskrywings in die afdeling ontvang word. Die volgende sondertoekennings is ook beskikbaar tot ZS deelnemers:-
Hoogste Gemiddelde Telling in al 3 Wedstryde — HOS TROFEE.
Hoogste Luisteraar Gemiddelde in al 3 Wedstryde — GORDON EASTES LUISTERAARS TROFEE.

Points: Five points for each contact. Points will however be deducted for errors in logging calls and serials.

Multiplier: A mulitplier of one for each zone worked. The zones are:-
Zone 1 — ZS 1 Zone 2 — ZS 2
Zone 3 — ZS 3 Zone 4 — ZS 4
Zone 5 — ZS 5 Zone 6 — ZS 6
Zone 7 — CR7, ZD5, ZE, 5H3, 7Q7, 9J2.
Zone 8 — A2C, CR6, ZD9, ZS2Mi, 7P8

Scoring: Total points on each band to be multiplied by zone multiplier on that band for band score. Sum of the scores for each band will be total all band score. Second contacts with the same station on one band will not score points. SWL's must show station heard, station being contacted and serial given.

Awards: Certificates will be awarded to the winners of each section, CW AM and SSB. Second and third place will be awarded certificates provided a minimum of 5 and 10 entries respectively are received in the section. The following special awards are also available to ZS contestants:-

Highest Aggregate Score in all 3 Contests — HOS Trof.
Highest Listener Aggregate in all 3 contests — GORDON EASTES LISTENERS TROPHY.
Highest CW Score — SILENT KEYS MEMORIAL TROPHY.
Highest AM Score — SILENT KEYS MEMORIAL TROPHY.
Highest SSB Score — NJB SSB TROPHY.

Hoogste GG Telling – STIL SLEUTEL MEMORIE TROFEE.

Hoogste AM Telling – STIL SLEUTEL MEMORIE TROFEE.

Hoogste ESB Telling – NJB ESB TROFEE.

*Hoogste Junior GG Telling – AKYAB TROFEE.

*Hoogste Junior AM Telling – FRED MILLS TROFEE.

Hoogste Enkelband GG – ANONIEM TROFEE.

Hoogste Enkelband AM – JOSEPH WHITE TROFEE.

Hoogste Enkelband ESB – HOËVELD TAK ESB ENKELBAND TROFEE.

*Sien volgende paragraaf vir Juniors.

Die Takdeelnemers trofee sal aan die tak met die hoogste persentasie taklede wat logpunte van 500 of meer aanbied toegeken word. Aan DX deelnemers (d.w.s. uitsluitende ZS) met die hoogste telling in elk van GG, AM, en ESB wedstryde, en die wenners vir elke landstreek mits 'n minimum van 3 logs vir daardie land aangebied is, sal toekenningssertifikate ontvang.

Juniors: Ten tye van die wedstryd sal 'n Junior beskou word as enige deelnemer wat nog nooit eerste plek in enige afdeling van die SARL Jaarlikse HF Wedstryde behaal het.

Operateuring: Deelnemers moet nie hulp aan ander deelnemers verleen nie of hulp van ander deelnemers ontvang nie.

Log Instruksies: Logs moet tyd stasie gehoor, volgnommer gegee en ontvang, en band aangee in hierdie volgorde. Luisteraars moet tyd, stasie, gehoor

*Highest Junior CW – AKYAB TROPHY.

*Highest Junior AM – FRED MILLS TROPHY.

Highest Single Band CW – ANON TROPHY

Highest Single Band AM – JOSEPH WHITE TROPHY.

Highest Single Band SSB – HIGHVELD BRANCH SSB SINGLE BAND TROPHY.

*See below for definition for Juniors.

Branch participating trophy will be awarded to the branch with the highest percentage of branch members submitting logs of 500 points or more.

For DX contestants (i.e. all other that ZS) certificates will be awarded to the highest score in each of the CW, AM and SSB contests and to winners in each country provided a minimum of 3 logs are received from that country.

Juniors: For the purposes of the contest a junior is regarded as any contestant who has never previously gained first place in any section of the SARL Annual HF contests. Juniors are however eligible for the senior trophy but can not win both in the same contest.

Operating: Contestants should not give or receive any assistance to or from other contestants.

Log Instructions: Logs to show time, station contacted, serials given and received, band, in that order. SWL's to show time, station heard, serial given, station to whom report given,

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volgnommer gegee, stasie aan wie verslag gegee is, en band aandui. Van alle deelnemers word verwag dat hulle hul tellingpunte self moet bepaal. Logs moet noukeurig nagegaan word om so doende kontak duplikasies te vermy. Dit geld ook vir die juistheid van die puntetelling voor aanbieding. Logs moet geadreseer word aan:-

Die Wedstrydkomitee,
Posbus 205,
Pinetown.
Natal.

Logs moet bogenoemde adres binne 14 dae na afloop van die betrokke kontak bereik. Die oordeling van die inskrywings berus by die Wedstrydkomitee wie se besluit finaal is.

band. All contestants are expected to compute their scores. Logs should be checked for contact duplications and proper point credit before submission.

Logs should be addressed to:-

Contest Committee,
P.O. Box 205,
Pinetown,
Natal.

to arrive not later than 14 days after the relevant contest.
Judging of entries will rest with the contest committee whose decision will be final.

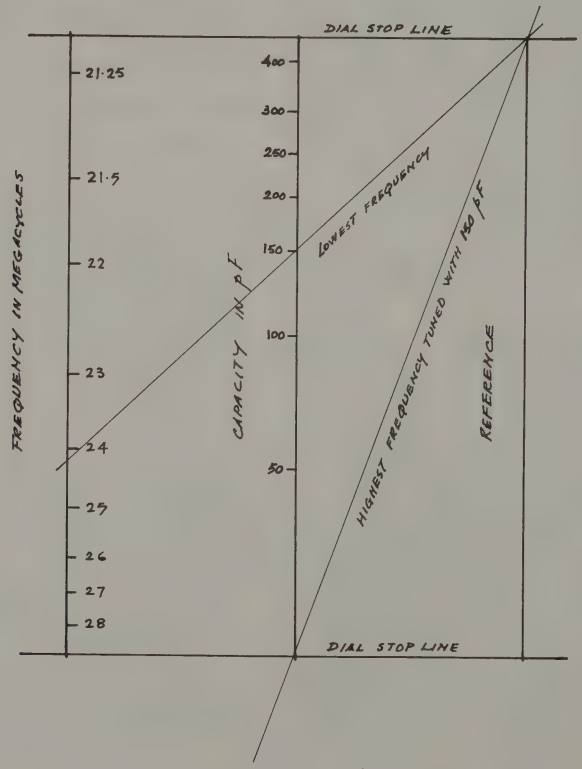

TABLE OF FREQUENCY & CAPACITY PLOTTED FROM DOMESTIC RECEIVER (BUSH 1950)

One of the needs of Listener Hams is that of finding suitable equipment at an economical price on which the amateur bands can be tuned in order to receive the Sunday Morning Bulletins. This problem occurred when the writer found it necessary to keep abreast of Ham chatter due to his accepting the responsibilities of local branch committee membership.

AN EXPERIMENTAL CONVERSION OF A DOMESTIC RECEIVER FOR AMATEUR BANDS

By Dick Swart – ZS1-001

Having several domestic receivers on hand in good shape some thought was put into seeing if these could not be converted in some manner. The first experiment was that of obtaining from Centre Page some 15 pF dual ganged tuning condensers and fitting these across the main tuning condensers in three of the sets on hand (two of which have no RF circuit). The immediate result was that the various bands could now be "Spread" for small sections and this where the domestic receiver tuned the amateur bands, was a great success as a first step. However it was felt that perhaps it might be possible to so alter the main tuning condenser, by its replacement with one of lower capacity, so that the Ham Band to be tuned could be spread to a greater degree and fully tuned by the condenser fitted.

Having on hand a set of Nomographs plotting inductance, wavelength and capacity, appearing in the Wireless World Diary, a study of the relationship of capacity to a given band of frequencies, showed that by a reduction of capacity the given band of frequencies (plotted from the RX to be converted) would be raised and that coverage would be restricted due to the bandspread taking place in the conversion. On the strength of this discovery a detail investigation was made on paper of the bands to be tuned, by the following method:-

The first thing was to take a sheet of paper and take off the various wave bands from the RX to be converted, especially noting the stop points of the dial pointer. This was then transferred to one of these parallel lines drawn on a suitably sized sheet of paper, the lines being approximately 2" apart (you require three lines for each band to be investigated). On the next adjacent line the value of the condenser capacity is plotted. Maximum capacity being opposite the lowest frequency tuned. Usually stray capacities in the circuit amount to about 30 pF so the Highest frequency tuned will occur opposite the 30 pF mark. As the tuning condensers are usually of the LOG rule, the capacity table say from a capacity of 450 pF to 30 pF will then be plotted in a logarithmic graduation, which can be taken from the Nomograph table and expanded graphically to cover the plotted frequency band. The third line now becomes a reference line.

Now you have the table showing the

frequencies tuned with the existing RX tuning condenser. Suppose we decide to use a 150 pF ganged tuning condensor to replace that in the RX, what frequencies will it cover? Placing a ruler, plastic if at hand, on the reference line at the lowest end of the band and joining this to the capacity of 150 pF plotted from your present tuning condenser, we read off on the frequency line the lowest frequency that will be tuned. In the diagram given, we have plotted a 450 pF to 20 pF condenser against a frequency band of approx: 21.25 megs. to 28 megs. Our object is now to choose a condenser capacity that will tune the 10 meter band. Plotting the 150 pF value will give us a band from approx. 24.4 megs to well below 40 megs. Take your ruler and using the same point on the reference line through the lowest point of the capacity scale and project this through to the frequency line which will give the highest frequency in this case below 40 megs.

This trial and error method will have to be carried out for all the bands tuned and a compromise reached as to the capacity eventually fitted otherwise we may find we lose the use of the lower frequency bands. In the case above having, say, decided on a capacity of 150 pF we can fit a 100 pF main tuning condenser and band spread this with a 50 pF ganged condenser in parallel, though a better combination would probably be 130 pF and 20 pF. Experimentation will show the best.

The best of this method is that it costs very little to carry out, and does not alter the rest of the circuit, though some alignment of the IF's may be needed and some padders on the bands tuned for best results but here we can call on the more experienced Hams for a hand.

The RX, as converted is now an AM-RX and will not as yet receive S.S.B.; However, if you convert two receivers it is possible to use one of them, without an antenna coupled, as a B.F.O. beating with the incoming signal being tuned by the other RX. (Both need conversion in order to tune the same frequency and the B.F.O. RX to have broad tuning necessary to tune to the null point.) It's best to select, if you can, a modern (circa 1950) receiver with an RF circuit. A Signal strength meter can be

Qsy Page 27

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by tekening van GWAD-ZS4UH

HERSTELLING

Daar het 'n fout ingesluip by die gegewens van die kubieke vierpool se aanpassing op die tekening bls.18 in die Maart uitgawe van Radio ZS. Hier volg die regte mate. Die aanpassingsharnas is van perspeks gemaak.

10M, 15M, 20M. 50 ohm konsentriese kabel, RG8U, 28 $\frac{3}{4}$", 50pf, 50pf, 50pf, 43 $\frac{3}{4}$", 2", 30pf, 30pf, 28 $\frac{1}{2}$", 1 $\frac{1}{2}$", 1", $\frac{3}{4}$".

NOISE SUPPRESSION (ELIMINATION?) IN MOBILE OPERATION

by John Hugo ZS1SC

Mobile working on the Ham Bands has today become commonplace. The development of S.S.B. transceivers has provided powerful and compact units which can readily be fitted to all but the smallest cars.

Through the use of transistors in providing the H.T. for the final stage, and by using semiconductors throughout in the receiver and low-power transmitter circuitry, current drain, the bugboo of mobile operating, has been cut down to a minimum.

Many hams today (the writer included) have one S.S.B. rig serving a dual purpose — off the A.C. mains as the "home station" and into the car with a quick-connect mobile mount for that outing in the country. Ham Mobile whips too, are now available commercially — easy to instal and with comparatively broadbanded frequency acceptance, they work well with little of that "on the nose" tuning which is needed for a really high "Q" homemade job.

It is quite easy to go mobile these days, therefore, as all you have to do is to be able to afford the equipment, and to follow simple instructions on how to instal it in the car.

Noise suppression, however, is quite a different matter. I have seen many installations where, whilst on the move, it has only been possible to work stations which have signals in the order of S.7 or above, and then to the annoyance of the XYL who keeps complaining that the noise is terrible.

Yes, it *is* possible to work the weak rare stuff whilst crusing along at 70! Here are a few hints which might solve your problems.

Ignition Noise —primary methods:
The commonest form of interference — this is distinctive by the regular pulses which increase in frequency with engine speed, regardless of whether the car is moving or not. Very often this noise is quite sharply tunable — peaking on certain bands and being almost non-existent on others. 10K Suppressors mounted right on the plugs are the first step, followed by a similar "inline" suppressor in the centre-lead of the distributor — as close to it as possible.

For this latter unit a suppressed "rotor unit" can often be obtained — usually from the distributors of those well known German and Dutch car radios. These work better than an external suppressor as the resistor is mounted inside the distributor right at the spark source.

Likewise, in very obstinate cases resistor plugs are the only cure. These are, however, sometimes difficult to obtain for the type of car which you may have.

The last resort, to kill the noise at its source is of course the screened harness such as used in aircraft. These are

available commercially, but are very expensive and usually are most effective. You can make your own but, remember, that the very high voltages employed can easily break down all but the best insulation in the H.T. leads.

"Clip-over" plug shields can be made from aluminium or brass cylindrical sleeves which earth efficiently on the metal part of the plugs and the engine block. Good quality braiding can be slipped over the H.T. leads and should be bonded to the metal plug shields, being careful to avoid electrical arc-through or shorts.

The distributor unit itself can be shielded by encasing it in a tin can, also, of course, properly bonded to the engine block. Usually this inconvenient and expensive method of suppression can be avoided by following other *secondary methods* of suppression, as follows:

Bypass the ignition switch terminal of the coil to the engine block with a good quality condensor.

Bypass the ammeter (if fitted) to the firewall similarly.

Likewise the ignition switch.

Likewise the break light switch.

And here's a good one — the *exhaust pipe system* — this is one of the commonest radiators of plug noise and, when suppressed, very often results in almost a complete cure. Proceed as follows:

(a) Connect a pair of headphones with long leads to the receiver in the car.

(b) Start the engine, switch on the set, tune to the noisiest band and set the idling to a fast tickover.

(c) Arm yourself with a large (at least 18") half-round or three-cornered file.

(d) Get down next to the exhaust system — starting near the front (well in front of the silencer) and "Short out" the exhaust pipe to the chassis of the car at various short intervals along the length of the pipe, whilst listening to the interference on the 'phones.

(e) You should find a point where the noise is substantially reduced.

(f) At that point bond the pipe to the chassis with a length of flexible braid. This can easily be done by driving a *large* self-tapping screw through one end of the braid into a hole drilled into the pipe itself at the critical point. Use a similar technique on the chassis side. *Clean the metal thoroughly* before bonding.

I've read a lot about bonding of bonnet release cables, speedo cables, choke cables, etc. to the firewall, but, honestly, I have never found any improvement through doing this.

Bonding the bonnet to the car body itself often does help, as often the bonnet itself isn't properly earthed, and, therefore, doesn't act as a screen over the engine.

Bond the engine too, to the body of the car itself. This has usually been incorporated by makers, however.

Do make sure that the braid on your coax feedline is effectively earthed to the *car* with a clean joint (all paint, grease, etc. removed) and not just connected to the rear bumper.

This should about take care of plug noise radiation – a noise limiter in your receiver might further improve the position, but the right way is to kill the noise first *at its source.*

Regulator Noise. This is often confused with plug noise. You can identify it positively by revving up the engine and switching off the ignition quickly whilst the engine is still turning fast. If a harsh crackling still persists, it's regulator sure enough. Here one must be careful not to place any condensors across the field terminals. This can cause burning of the points and subsequent breakdown. A *small* condenser, say a .001 disc ceramic, is permissable, provided you series it with about a 5 or 10 ohm resistor. A small choke also works well in the field lead – the car radio people make a good iron core one which is generally available quite cheaply.

A fairly large (0.5mfd) coaxial condenser in the armature lead right at the regulator also usually helps the situation. Be sure that it is securely grounded to the firewall.

Generator Noise. This is most distinctive as a whine which increases in pitch with engine speed.

A good by-pass (coaxial type) condenser right on the generator at the armature (not the field! !) terminal usually cures this.

Wheel Static –most annoying. This comes and goes and is often dependent on the type of surface over which you are driving and is usually a popping noise, bearing little relationship to the speed of the car. This can be done by inserting small shorting springs under the grease cups of the wheel hubs, or by the injection of anti-static powder into the tyres. Fortunately, this complaint does not seem to be as common as it was some years ago. Perhaps tubeless tyres have something to do with it.

Body Static – caused by unequal discharging of various parts of the car body which have become charged with static electricity. Fortunately not common and occurring usually in very dusty and dry conditions. A good car wash usually helps.

Finally be sure that the rig itself is securely mounted and well earthed to the car. Make sure that all antenna connections are sound and tight.

Happy mobiling.

Conversion *de Page* 24

placed in the cathode circuit of the last IF amplifier; this is usually of about 3 to 5 ma. so a disposal type aircraft indicator of approx: 8 ma. full scale deflection was used very successfully.

A new scale for the converted RX must be plotted either from known stations or with a signal generator.

Hamads

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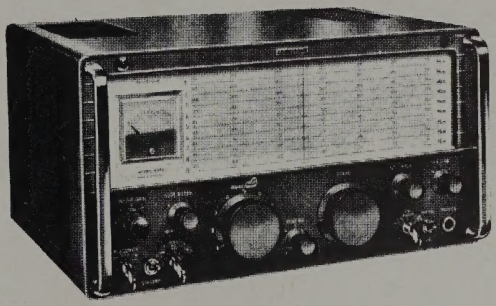

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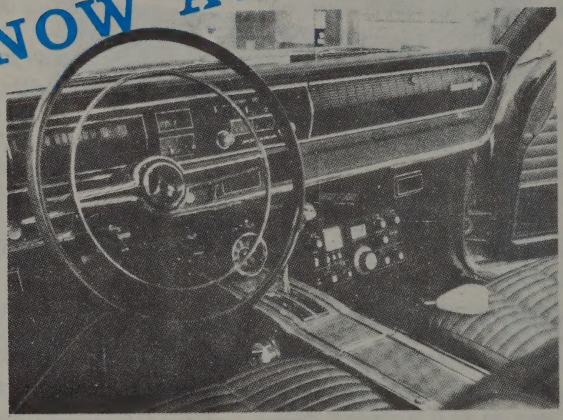

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PUBLISHED BY THE SOUTH AFRICAN RADIO LEAGUE, P. O. BOX 3911, CAPE TOWN
AND PRINTED BY TYPEX PRESS (PTY.) LTD., 201 BREE STREET, CAPE TOWN